

## CLEANING DEVICE

### TECHNICAL FIELD

[001] The present invention relates to a cleaning apparatus and more particularly, relates to a method and apparatus for removing debris from one or more feet.

### BACKGROUND INFORMATION

[002] Washing a small pet such as a dog is a common, yet often dreaded, chore. Pet washing is often undertaken indoors using a conventional bathtub or outdoors using a tub or garden hose. However, a more frequently encountered need is to merely clean the dirty paws of an animal before the animal is permitted to come indoors. A complete washing of the animal is simply unnecessary and undesirable in this instance.

[003] One problem with cleaning an animal's feet is that the animals are often not cooperative. It is often difficult to get the animal to stay still, especially for extended periods of time. As a result, it is necessary to clean the animal's feet in as little time as possible.

[004] Another problem is that the debris on the animal's feet (such as dirt, leaves, grass, snow, salt, small rocks/pebbles/sand, and the like) may be very difficult to remove. Often, scrubbing alone is often not enough to remove the debris and it is frequently necessary to use water and/or a

cleaning solution (such as soap and the like). Unfortunately, a bucket filled with soapy water does not work well because it involves having to clean each paw separately. Additionally, each foot must be held up in the air. This is especially difficult while cleaning the feet of an uncooperative animal.

[005] Various apparatus have been proposed in the prior art for the complete washing of a pet such as a dog. Existing devices, however, are not particularly adapted for the thorough cleaning of the paws of a pet. Accordingly, there exists a need for a device that can easily and effectively clean the feet of an animal. The device should preferably allow the animal to stand in one place without having to hold the animal's foot in the air while the device cleans the animal's foot.

#### SUMMARY

[006] The present invention features a cleaning device having a body, a grate, and at least one cleaning apparatus. The cleaning device can be used to clean the foot or paw of an animal or human. The body defines a cavity having a longitudinal axis A and an opening sized and shaped to accept at least one foot. In the preferred embodiment, the cavity is adapted to contain a quantity of liquid such as, but not limited to, water and soap.

[007] The grate is disposed within the cavity and includes a plurality of open regions. In the preferred embodiment, the grate is disposed beneath the top surface of the liquid. Optionally, the grate is movably disposed within cavity such that

in a first position, the grate is disposed above the top surface of the liquid proximate the opening in a first position, and in a second position, the grate is disposed beneath the top surface of the liquid. A biasing device preferably urges the grate in the first position and allows the grate to move from the first position to the second position when a substantially downward force is applied against the grate. The grate may also be provided with a locking device to secure the grate in at least the first position when a substantially downward force is applied against the grate. Optionally, a sensor may monitor the position of the grate and turn the cleaning device on when the grate is in the second position.

[008] The cleaning apparatus, preferably a brush or a pad, is disposed within the cavity beneath the grate such that at least a portion of the cleaning apparatus is disposed above the grate through the plurality of open regions. A motor is operatively connected to the cleaning apparatus such that the cleaning apparatus is movable along the longitudinal axis A.

[009] According to one embodiment, the cleaning apparatus includes a plurality of cleaning apparatuses secured to a movable frame. The frame and at least one inner edge of the cavity include a groove and a tab, wherein the groove and the tab guide the frame along the longitudinal axis A. Alternatively, the frame may include wheels.

[0010] The moveable frame is operatively connected to the motor via linkage. In one embodiment, the motor is rotatably connected

to a cam and the cam is operatively connected to the frame with a linkage. The motor rotates the cam thereby moving the linkage and the frame substantially along the longitudinal axis A.

[0011] According to another embodiment, the cleaning apparatus rotates about an axis B substantially perpendicular to, and in substantially the same plane as, the longitudinal axis A.

[0012] In one embodiment, the motor is rotatably connected to a cam. The cam is operatively connected to the frame with a linkage. The motor rotates the cam thereby moving the linkage and the frame substantially along said longitudinal axis A. The inner edge of the cavity may include a toothed portion and the cleaning apparatus may include a toothed gear rotatably disposed through a frame. As the frame is moved substantially along the longitudinal axis A, the toothed gear engages the toothed portion of the inner edge of the cavity thereby rotating the cleaning apparatus about the axis B.

[0013] Alternatively, the cleaning apparatus includes a first toothed rod connected at a first end of the cleaning apparatus. The inner surface of the cavity includes a second toothed rod rotatably connected to the motor which engages the first toothed rod. As the motor rotates the second toothed rod, the first toothed rod of the cleaning apparatus engages the second toothed rod and moves the cleaning apparatus substantially along the axis A and rotates the cleaning apparatus about the axis B.

[0014] The present invention also features a method of cleaning a foot. The method includes placing a foot on a grate having a

plurality of openings disposed therethrough. The grate is disposed within a cavity of a basin. At least one cleaning apparatus is arranged substantially beneath the grate within the cavity such that at least an upper portion of the at least one cleaning apparatus is disposed through the plurality of openings within the grate. The cleaning apparatus moves substantially along a longitudinal axis of the cavity. As the cleaning apparatus moves, the upper portion of the cleaning apparatus, which is disposed above the grate, contacts the foot. Additionally, the method may also include rotating the cleaning apparatus about an axis substantially perpendicular to the longitudinal axis A.

#### BRIEF DESCRIPTION OF THE DRAWINGS

[0015] These and other features and advantages of the present invention will be better understood by reading the following detailed description, taken together with the drawings wherein:

[0016] FIG. 1 is a side exploded view of one embodiment of the cleaning device according to the present invention;

[0017] FIG. 2A is a side exploded view of the embodiment of the cleaning device shown in FIG. 1 wherein the grate is movably disposed within the basin according to the present invention;

[0018] FIG. 2b is a side exploded view of another embodiment of the cleaning device wherein the grate is movably disposed within the basin according to the present invention;

[0019] FIG. 3 is a top plan view of the one embodiment of the grate according to the present invention;

[0020] FIG. 4 is a side exploded view of another embodiment of the cleaning device shown in FIG. 2B according to the present invention;

[0021] FIG. 5A is a top plan view of yet another embodiment of the cleaning device shown in FIG. 4 according to the present invention;

[0022] FIG. 5B is a top plan view of a further another embodiment of the cleaning device shown in FIG. 4 according to the present invention;

[0023] FIG. 6 is a top plan view of yet another embodiment of the cleaning device shown in FIG. 4 according to the present invention;

[0024] FIG. 7A is a top plan view of a further embodiment of the cleaning device shown in FIG. 4 according to the present invention; and

[0025] FIG. 7B is an end cross sectional view of another embodiment of the cleaning device shown in FIG. 7A according to the present invention.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0026] A cleaning device 10, FIG. 1, includes a basin 12 defining at least one cavity 14 with at least one wall 16. In the preferred embodiment, the basin 12 is made from plastic, though this is not a limitation of the present invention. The basin 12

and cavity 14 may have any shape (for example, but not limited to, a rectangle, square, circular or tubular shape) and includes an open region 18 sized and shaped to accept at least one foot (preferably two or more). The exact size and shape of the basin 12, the cavity 14, and the opening 18 will depend on the number and size of the feet to be cleaned as well as the circumstances of its installation, and is within the knowledge of one skilled in the art. The cavity 14 also holds a predetermined amount of water (and optionally a cleaning solution such as soap or the like) 20. The amount of water 20 will depend upon the size of the cavity. For exemplary purposes only, the basin 12 and cavity 14 are preferably rectangular in shape. The basin 12 is preferably approximately 20 inches wide by approximately 15 inches long and the approximately 5 inches in height. The cavity 14 is preferably approximately 15 inches wide by approximately 10 inches long and approximately 5 inches in height and has an opening 18 that is preferably approximately 15 inches wide by approximately 10 inches long.

**[0027]** The cavity 14 also includes one or more grates 22 disposed proximate the open region 18. The grates 22 are preferably removably secured to the cavity 14 using any manner known to those skilled in the art. The grate 22 (FIG. 3) is perforated and includes a framework of substantially parallel or latticed bars 21, forming open areas 23. The grate 22 is preferably positioned beneath the water level 64 such that approximately 2

inches of water are disposed above the grate 22. Alternatively, the grate 22 may be positioned above the water level 64.

**[0028]** In another embodiment, the grate 22, FIGS. 2, may be moveably disposed about the cavity 14. The grate 22 may be disposed on one or more biasing mechanisms 26 (such as, but not limited to a spring or the like) which are secured to the cavity 14. According to this embodiment, when no weight is disposed on the grate 22, the biasing mechanisms 26 urge the grate upwards such that the grate is positioned above the water level 64. When weight is placed on the grate 22, the biasing mechanisms 26 is overcome and the grate 22 moves downward such that the grate 22 is positioned below the water level 64. The cleaning device 10 may further include a locking device 28 (such as, but not limited to, a tab or a protrusion) to lock the grate 22 in position.

**[0029]** This embodiment allows the cleaning device 10 to be left in place over long periods of time. When not in use, the grate 22 may be locked in the position over the water line 64. This allows animals and people to walk on and over the cleaning device 10 without getting there feet wet. As will be explained in greater detail hereinbelow, the cleaning device 10 may also include a position switch or sensor 30 that monitors the position of the grate 22 such that the cleaning device 10 is automatically turned on whenever the grate 22 is positioned beneath the water level 64. This embodiment is particularly useful when the cleaning device 10 is permanently installed as part of an entranceway.

**[0030]** According to one embodiment, the cleaning device 10, FIG. 1, includes a plurality of reciprocating cleaning apparatus 32 which are driven by a motor 36 in linkage 38. Each cleaning apparatus 32 is positioned across the width of the cavity 14 substantially perpendicular to the longitudinal axis A of the cavity 14. A portion 33 of the cleaning apparatus 32 is disposed through the open areas 23 of the grate 22 is positioned above the grate 22. This portion 33 contacts the foot. The cleaning apparatus 32 removes the debris from the foot as it 32 contacts the foot and moves back and forth on the direction.

**[0031]** The cleaning apparatus 32 preferably includes any type of brush or pad 24 which is preferably mounted to a movable frame 40. The cleaning apparatuses 32 move back and forth along the longitudinal axis A of the cavity 14 such that the path of the cleaning apparatuses 32 substantially covers the entire open region 18. This allows the feet to be cleaned virtually anywhere on the grate 22.

**[0032]** The motor 36 in the linkage 38 may include any motor or linkage known to those skilled in the art. For example, as will be explained in greater detail hereinbelow, the linkage 38 may include a cam device 39 rotatably connected to the motor 36 (for example, but not limited to, with a first rod 81) and to the movable frame 40 (for example, but not limited to, with a second rod 82). As the motor rotates the cam device 39, the second rod 82 is subsequently moved back and forth, thereby causing the movable frame 40 move back and forth along the direction of arrow

A. In one embodiment, the frame 40 may include tabs or wheels 87 which engage the bottom surface 16 of the basin 12.

**[0033]** According to another embodiment, the cleaning device 10, FIG. 4, also includes a plurality of rotatable and reciprocating cleaning apparatuses 32 which are substantially similar to the previous embodiment and are preferably driven by a motor 36 and linkage 38. The cleaning apparatuses 32 preferably include generally cylindrical brushes or pads 24. A portion 33 of the cleaning apparatuses 32 is disposed through the open areas 23 of the grate 22 and is positioned above the grate 22. As discussed above, the grate 22, FIG. 2B, may be movably disposed within the cavity 14.

**[0034]** An important aspect of this embodiment is that the cleaning apparatuses 32 rotate about the direction of the arrow B in addition to moving along the longitudinal axis A. Rotating the cleaning apparatuses 32 increases the cleaning surface/area 34 of the cleaning apparatuses 32 because the entire surface (i.e., the top as well as the bottom) of the cleaning apparatuses 32 may be used for cleaning. As a result, the cleaning apparatuses 32 will need to be cleaned less often. The cleaning apparatuses 32 may rotate 360 degrees in one direction continuously or back and forth in the direction of the arrow B.

**[0035]** In the previous embodiment wherein the cleaning apparatuses 32 only moves along the direction of arrow A, gravity causes the debris removed from the foot to become lodged within the cleaning surface of the cleaning apparatuses 32, thereby

reducing the overall effectiveness of the cleaning apparatuses 32. If the built-up debris is allowed to remain and build up on the cleaning apparatuses 32, the overall effectiveness of the cleaning device 10 is substantially decreased. In some cases, for example where one or more feet of the animal are very dirty or the material (such as clay and snow) is very clumpy or slippery, the built-up debris on the cleaning apparatuses 32 can be accidentally transferred to the other feet (which may in fact have been previously clean), thereby effectively contaminate the other feet and increasing the amount of cleaning necessary. While it is possible to remove the built-up debris from the cleaning apparatuses 32, this substantially increases the amount of labor involve and decreases the cleaning device's 10 utility.

**[0036]** In contrast, the cleaning apparatuses 32 of the present embodiment rotate about the direction of arrow B, thereby preventing debris from building-up on the cleaning surface/area 34. As the cleaning apparatus 32 is rotated, the portion 33 of the cleaning surface/area 34 (which is initially facing upwards) is moved through the water 20 thereby agitating the water 20. The moving water 20 aids in removing and/or loosening-up the debris from the cleaning surface 34. Moreover, because the portion 33 is rotated and eventually faces downward, gravity acts to pull the debris away from and remove the debris from the from the portion 33. As a result, the present embodiment automatically and continuously removes debris from the cleaning

surface/area 34 of the cleaning apparatus 32 without the need for human intervention.

**[0037]** According to one embodiment, the cleaning apparatus 32, FIG. 5, may include a movable frame 40. The plurality of cleaning apparatuses 32 are preferably rotatably secured about a pivot 44 of the frame 40. The frame 40 is operatively connected to the motor 36 via linkage 38 in any manner known to those skilled in the art. The motor 36 may be disposed virtually anywhere, but is preferably disposed within a chamber 46 in the basin 12. According to the preferred embodiment, the linkage 38 includes a cam 39 rotatably connected to the motor 36. A rod 82 is pivotably connected to the cam 39 and to the frame 40. As the motor 36 rotates the cam 39, the rod 82 moves back and forth, thereby moving the frame 40 in the direction of arrow A.

**[0038]** According to one embodiment, the frame 40, FIG. 5A, includes a tab or a protrusion 41 which slides within a groove or channel 42 disposed along the edge of the cavity 14. Alternatively, the frame 40 may include a plurality of wheels 49, FIG. 5B. The wheels 49 may optionally move within a channel 47 to prevent the frame 40 becoming bound.

**[0039]** According to another embodiment, the motor 36, FIG. 6, may be operatively connected to one or more threaded rods 50. According to this embodiment, the cleaning apparatus 32 include a threaded shaft 52. The threaded shaft 52 has a thread that corresponds to the thread of the threaded rods 50. As the

threaded rods 50 are rotated about the direction of the arrow C, the cleaning apparatus 32 is moved along the longitudinal axis A and is rotated about the direction of the arrow B. In the preferred embodiment, threaded shafts 52 are sandwiched between two threaded rods 50.

[0040] According to yet another embodiment, the plurality of cleaning apparatuses 32, FIGS. 7, are preferably rotatably secured about a pivot 44 of the frame 40. One or more of the pivots 44 also include a toothed gear 57 which interlock with one or more toothed portion 59 secured to the edge or bottom surface 16 of the cavity 14. The frame 40 is operatively connected to the motor 36 via linkage 38 in any manner known to those skilled in the art and may slide along the bottom of the cavity 14 or within a groove 42. According to the preferred embodiment, the linkage 38 includes a cam 39 rotatably connected to the motor 36 as previously discussed. As the frame 40 moves in the direction of arrow A, the toothed gear 57 engages the toothed portion 59 of the cavity 14, thereby rotating the cleaning apparatus 32.

[0041] In the exemplary embodiment, the cleaning apparatuses 32 are rotated about the direction of the arrow B faster than they are moved along the longitudinal axis A. Moving the cleaning apparatuses 32 in the direction of the arrow B faster than the direction of arrow A increases the amount of cleaning surface 34 contact with the feet and creates a scrubbing effect, thereby aiding in the removal of the debris. However, it is important that the cleaning apparatuses 32 move sufficiently fast in the

direction of the arrow A such that the entire foot is cleaned in a minimum amount of time. In the preferred embodiment, the ratio in which the cleaning apparatuses 32 are rotated in the direction of arrow B to being moved in the direction of arrow A is approximately 2:1 to approximately 5:1. Other ratios are also contemplated.

[0042] Accordingly, the present invention is capable of cleaning one or more feet in a minimum amount of time. The present invention is easy to use and is capable of removing a wide range of debris.

[0043] Moreover, the present invention automatically removes debris from the cleaning device without the need of human interaction. As a result, debris does not build-up on the cleaning surface and the cleaning time is significantly reduced. The present invention also accomplishes this without the use of complicated and expensive pumping and piping systems that can easily become clogged by debris.

[0044] Other methods and apparatus are envisioned for moving the cleaning apparatuses 32 along the longitudinal axis A as well as rotating the cleaning apparatuses 32 about the direction of the arrow B. The present invention is not be limited to any one method or apparatus for accomplishing this except where specifically noted.

[0045] Modifications and substitutions by one of ordinary skill in the art are considered to be within the scope of the present

invention, which is not to be limited except by the following claims.